

large use that is made of the art-science in nearly every investigation of the present day. As regards the artistic element present, it is not in our province to dwell upon it. In many examples of portraiture it would have been well had that abomination—retouching of the negative—been avoided. As showing what a grand pencil is sunlight to the artist, we may mention the exhibits of Robinson, Blanchard, Mrs. H. Roscoe, and Slingsby, in all of which are to be found true artistic feeling and perfect manipulation. The works of Payne-Jennings, Bowness, the Royal Engineers, Stephen Thompson, and England may be classed amongst the best of the landscape work.

Amongst technical work we have examples of a capital photo-relief process by Warnerke, by which an artist's own drawing can be faithfully reproduced as a block for surface printing. The mechanical printing processes from gelatine are also admirably represented by the Autotype Company, as is that known as Woodbury-type.

This notice would be incomplete without calling attention to the photographs taken during the recent Arctic expedition under Sir G. Nares, which have been exhibited by the Admiralty, and also to those taken by Mr. Grant, who accompanied Sir Allan Young in the *Pandora*. Both sets of photographs are very good when the difficulties under which they were taken are considered.

THE NORWEGIAN DEEP-SEA EXPEDITION¹

THE *Voringin* left Tromsø on July 14, lay the following day, which was a Sunday, in Kjosén, by Lyngen, and we recommenced our work on the 16th, off Fuglø (71° N. lat.). From this point a cross-section was

made to lat 71½°, long. 14° E., the bottom reaching nowhere more than 900 fathoms. On the 18th we steered southwards, and took up another cross-section parallel to the above, and about twelve geographical miles distant. This was finished on the 20th, and we sailed to Tromsø, where we arrived at midnight. In the last cross-section



FIG. 1.—Beerenberg, Jan Mayen, from the South-west.

we found a depth of more than 1,200 fathoms on the north-east border of the deep-sea bay abutting on the steep bank outside Vesteralen and Lofoten.

In Tromsø the ship was completely fitted out for our cruise to Jan Mayen. We left that town on July 24, passed out the Malangenfjord, and steered westwards. In lat. 70°, long. 5° E., we reached the cross-section, whose eastern part we had already worked out, and

shaped our course directly for Jan Mayen. This was on the 26th, and the dredge came up, full of mud, *biloculina* clay, but almost without animals. The following day we found 0° C. in 500 fathoms depth, but farther west, in lat. 71°, long. 5° W., the isotherm of 0° C. was found, late in the night, in only twenty fathoms' depth. This proves that we were fairly in the polar current, and that the boundary between it and the warm Atlantic current (the

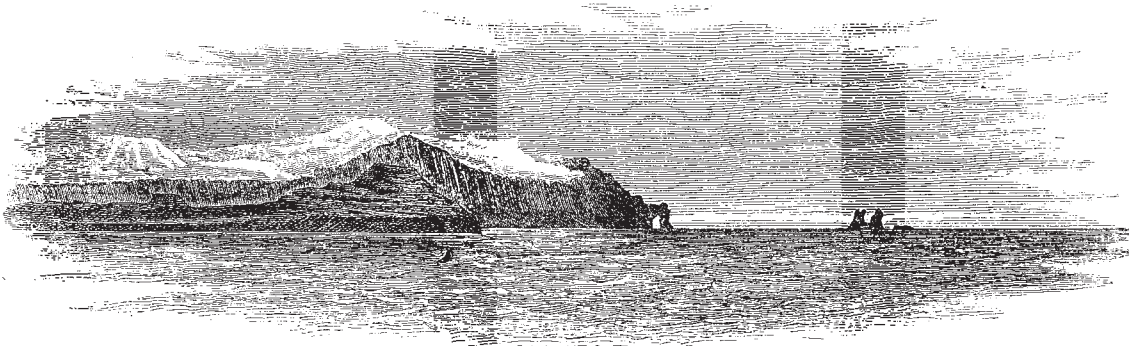


FIG. 2.—Jan Mayen—South-west Cape, and the Seven Rocks.

so-called Gulf Stream) is a very steep surface, like that of the "cold wall" on the American coast. The temperature of the surface of the sea was here 4°·6 C. At night the fog came on, and the next day we steered cautiously westwards, sounding at short intervals; but the depths

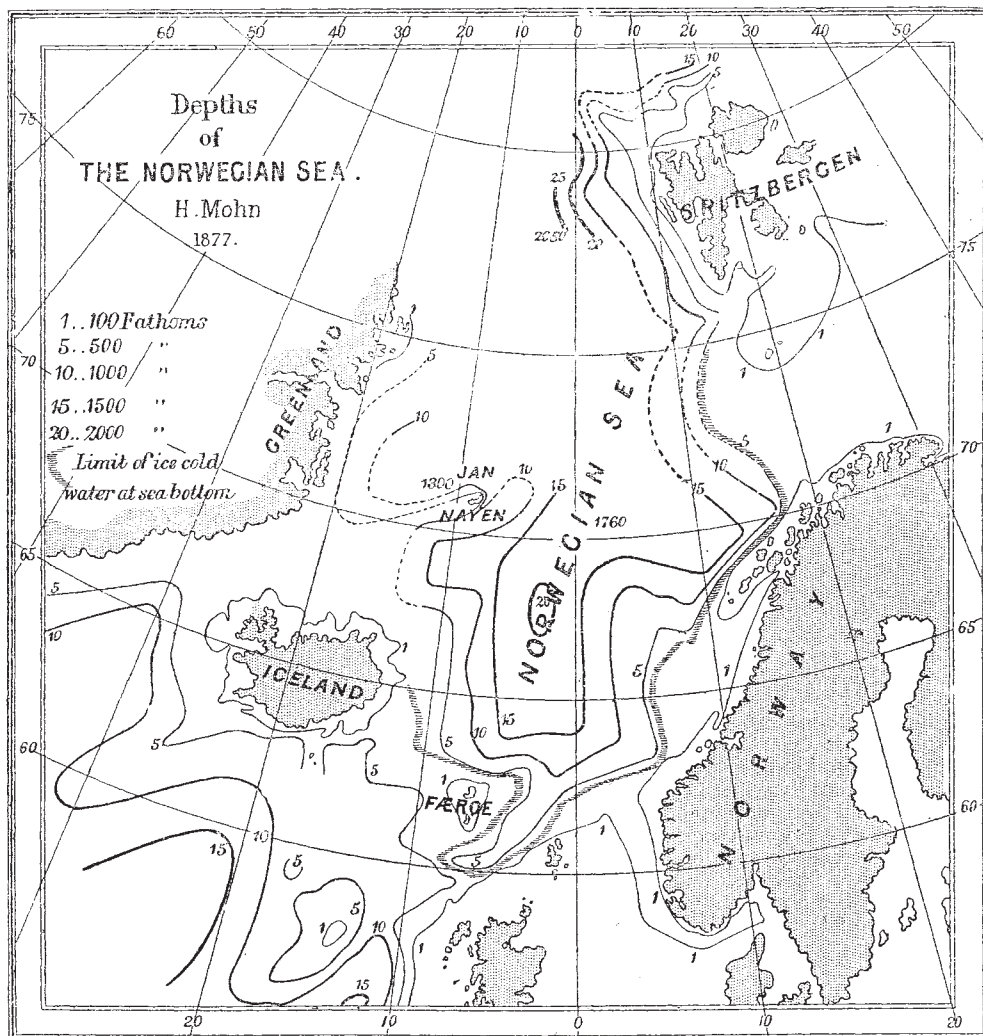
¹ See NATURE, vol. xvi. p. 271.

went on increasing to more than 1,000 fathoms, before a less depth was sounded. At last, just when we were sitting at the dinner-table, we heard the mate cry out, "I can see the glacier ahead." The ship was immediately stopped, and a sounding gave 140 fathoms. The fog began to ascend a little, and we were soon able to dis-

tinguish a huge glacier, hanging on the steep rock, and bathing its foot in the sea. In order to ascertain the distance from the shore we fired a gun, and the observation of the echo gave the distance a little less than one nautical mile. By-and-by the fog lifted higher, and we could see the two terminating points of the eastern side of the base of the great Beerenberg. In the afternoon we started anew in order to round the island and find shelter on the west side, the wind and sea coming from the north-east. But as soon as we were on a northerly course, abreast of the north point of Jan Mayen, the fog again grew so thick that we could only see a couple of ships' lengths ahead. We steered then first northwards, then

westwards, southwards, and south-east, the temperature of the sea surface being taken every quarter-of-an-hour to keep us informed of the proximity of the ice. The surface temperature went down to $2^{\circ}3$ once, but kept generally at $3^{\circ}5$, or more. At last when we were approaching the west coast and had commenced sounding to find a suitable anchorage, the fog lifted so that we could see the shore and allowed us to choose our berth. At midnight we dropped the anchor in the northernmost of the three large bays of the west side, about half-a-mile from the nearest shore.

The next day was wonderfully calm, but the fog covered the higher parts of Jan Mayen. We went on



shore, the sea being so calm that we could step on shore without any inconvenience. The shore consisted of volcanic sand, quite black, and was, higher up, covered by driftwood thickly strewn on a level surface. To the left was a steep cliff wonderfully rich in colour, the abode of thousands of sea-birds, whose inner slope, consisting of ash and scoriæ, showed it to be a part of a former crater. The scientific party spread in different directions and made the best of the time in surveying, collecting specimens of plants and rocks, and drawing; one polar fox was killed. The plants found belong to very few species, the vivid green we had seen from the ship being only a cover of moss. The flowers had just come

out, and all the lower part of the island, up to about 2,500 feet, was generally free from snow, the snow lying only in patches in the lower regions where a larger mass was gathered in ravines. The rocks were all volcanic, and the peaks seemed all to be built of loose stones thrown out from craters, while solid lava and tufa were found in the lower parts. In the afternoon I went on shore again, happily, because this was the last time we were able to do so, the sea being on the following days too high, and Jan Mayen does not present any bay giving shelter for a boat. I directed my course northwards, found a lagoon filled with fresh water, and shut off from the sea by a low wall some 300 feet in breadth.

The wall was covered by driftwood. On the east side of the island there is a similar lagoon, but much longer and with brackish water. On my return to the boat I shot a fox which came suddenly upon me and showed the greatest curiosity at seeing a human being.

The next day the wind and sea had risen, and landing was impossible. We weighed, therefore, and sailed again round the north part of the island. The clouds allowed us to see the lower part of the land, and for a while Beerenberg, the huge volcano of Jan Mayen, showed its snow-white cone to our enchanted eyes. The captain, assisted by his officers and myself, surveyed the coast as far as circumstances permitted, and got abundant material for an improved map of Jan Mayen. The Admiralty chart, constructed after Scoresby and Zorgdrager, proved very good, and afforded us material aid both in navigating and as a base for the improvements we were able to obtain. At midnight we anchored on the eastern side, south of the "egg-crater," and off the great lagoon.

The next day we took altitudes of the sun from the ship's deck, landing being impossible. The latitude of the map proved correct; but our chronometers, compared in Tromsø and Bodø before and after our cruise with Greenwich time, sent per telegraph from the observatory in Christiania, showed that Jan Mayen lies about half a degree of longitude farther west than in the chart. Further measures indicated also that Jan Mayen is not quite so long as given in the chart, and that its southern half is somewhat broader.

Next day we weighed, and went eastwards, sounding and dredging. Beerenberg was quite clear, and presented a magnificent aspect (Fig. 1). The winds were at times very high, up to fifteen metres per second, and very variable in direction, a phenomenon which Scoresby mentions in his description of the waters of Jan Mayen. The fauna was very interesting; it had much similitude to that of Greenland. The temperature at the bottom was about -1°C ., and in this cold water many well-known animals reach quite gigantic proportions. At night we anchored outside the lagoon.

The following day we weighed, and steered northwards. The height of Beerenberg was measured, the distance and course of the ship being taken as base line. Three different measures were in close agreement, and the mean was a height of 5,836 feet, which is nearly 1,000 feet lower than the height given by Scoresby. An appreciable current from north-east to south-west would make the number less still. This determination makes Beerenberg lower than the highest point in Iceland, viz., Oeröfajökull, which is more than 6,000 feet high. We went to the north of the island, and found 1,000 fathoms in a distance of only one geographical mile from the north point, which indicates that the foot of Beerenberg continues its slope of 10° so far beneath the surface of the sea. Thence we steered westwards and took soundings, which were continued the whole night. The wind was north-west, and the temperature of the air fell to $+0^{\circ}2\text{C}$.

A depth of 1,032 fathoms having been found seven geographical miles north-west of Jan Mayen, and a serial sounding having shown 0°C . in a depth of only ten fathoms—surface water being as low as $+2^{\circ}\text{C}$., we steered again towards the west coast of Jan Mayen. On the morning of August 8 we were near our first anchorage, but the swell was too heavy to try to land. We then went south-westwards along the shore and studied the country as well as circumstances permitted, the fog sometimes hiding it from our view. We were nevertheless able to get a series of sketches, and our rate told us that the island, as mentioned above, must be shorter than it is shown on the map. At noon we passed Cape Southwest and got a fine view of it (Fig. 2). The point north of Cape Southwest showed two extremely regularly built volcanic cones, the outer one close at the sea, the inner one quite small, and both of a reddish tint. On the higher

land between Cape Southwest and this point there is also a similar larger cone. The Cape itself is perforated by a tunnel at the level of the sea.

I got the distinct impression that Jan Mayen is from end to end of comparatively recent volcanic origin. Its aspect reminded me of parts of Iceland, which are of more recent volcanic origin, e.g. the peninsula of Reykjanes. It had nothing in common with the doleritic formation of the Färö Islands. In the afternoon a sounding was taken and the dredge lowered some five geographical miles south-west of Jan Mayen. The depth was only 263 fathoms. The dredge brought up lots of stones and a rich fauna. The stones were mainly volcanic, but among them I found a piece of granite, one of quartz, and of green chloritic schist. Here we bade adieu to Jan Mayen; the island was a long time out of sight, covered by the always prevailing fog, and the next morning we obtained eight geographical miles farther south, already 1,050 fathoms. Having sailed some ten geographical miles farther south we sounded again and found 1,004 fathoms and 0°C . at a depth of twenty fathoms. This achieved, all sail was set and the course shaped eastwards; the water was let off the boiler in order to get it cooled and cleaned. The next afternoon this was finished and we started under steam eastwards and homewards. When we were under sail the wind was north-west, but very feeble. The next day observations showed that we had moved south-south-east instead of east—a proof of our being in the Polar current. The following days we sailed in the finest weather eastwards, sounding and taking observations of deep-sea temperatures. On the morning of the 7th we had a depth of 2,005 fathoms. The temperature of 0°C . was later found in a depth of 450 fathoms. In the afternoon of the 9th we sighted land—the southern islands of Lofoten. Next day we entered the Vestfjord, where we dredged on the 11th, and arrived at midnight at Bodø.

In Bodø Capt. Wille took absolute magnetical observations. On the 15th we steamed into the Salton-Fjord and Skjerstad-Fjord, where we dredged and took temperature soundings, which showed, by means of Negretti and Zambra's thermometer, that the temperature was constant ($3^{\circ}3$) from 90 fathoms to the bottom in 270 fathoms. On August 18 we went from Bodø, out in the Vestfjord, and took a temperature series in the same place where we had been on June 22. The result was that the temperature had still its minimum in sixty fathoms, but it was now in this depth $4^{\circ}7$, and at the bottom, in 140 fathoms, $5^{\circ}8$. The whole mass of the lower water had consequently had its temperature raised as much as 1°C . The cause of this singular distribution of temperature so late in summer is inexplicable to me. This was our last operation this year. The course was shaped southwards, and on August 23 we arrived at Bergen, where the ship was paid off and the members of the scientific staff returned to their homes.

The expedition has this year been favoured with the best weather. Nothing has prevented the work from being carried on day and night, and the results obtained are therefore very extensive compared with last year.

The accompanying small chart shows in broad features the results of the soundings, combined with those of the Swedish expeditions to Spitzbergen and those of the *Bulldog*, *Porcupine*, and *Valorous* expeditions. The shaded line shows the boundary line at the sea-bottom between the ice-cold water of the Polar Sea and the warmer water of the Atlantic, as far as our observations hitherto have determined it.

Next year the expedition will work up the region between North Cape, Jan Mayen, and the north of Spitzbergen, and possibly make a trip eastwards in the direction of Novaya Semlya, in order to determine the site of the isothermal line of 0°C . at the sea-bottom, which may be regarded as the limiting line for the wanderings of the

masses of cod, the object of the great winter and spring fisheries of Northern Norway. For this expedition the Norwegian Storting has already voted the necessary sum of money.
H. MOHN

NOTES

THE communications from Mr. Stanley in the *Telegraph* of Thursday and Monday last, though containing few positive additions to our knowledge, are full of interest; the episode on the arrival of the starved and wretched party at Ni Sanda is quite thrilling. Notwithstanding the number of cataracts and rapids on the Lualaba—Congo, Stanley maintains it is well fitted to become a great commercial highway—2,000 miles of uninterrupted water communication, opening up an extent of country embracing 600,000 square miles. North of the equator it receives a tributary 2,000 yards wide at its mouth, coming from a little north of east, and which, according to our present imperfect knowledge, is likely enough to be the Welle. Mr. Stanley speaks of the “infamous inaccuracy” of our present charts of West Africa, an inaccuracy which cost him the lives of many of his men, but which, no doubt, he will be able to correct. Three of Stanley’s letters are dated from Nyangwe, and were written about a year ago. In them he speaks in the strongest language of the manner in which the slave-trade is carried on in that region, describes the wonderful forest scenery of the country between Tanganyika and Nyangwe, and gives some tender reminiscences of Livingstone preserved among the people, among whom the great traveller sojourned for so long. Mr. Stanley also endeavours to clear up the geography of the region between the Victoria, the Albert, and Tanganyika, showing that the most erroneous and confused ideas on the subject had been accepted mainly on the reports of natives to Sir Samuel Baker. No one now believes that the Tanganyika is connected with the Albert Nyanza, and, indeed, as Stanley suspects himself, he is, in refuting this notion, slaying the slain. From the little foretaste given us in these preliminary letters, there is no doubt that there is a rich feast in store for us of new and valuable information, and of adventure scarcely paralleled in the history of geographical exploration.

THE last number of the *Bulletin* of the Belgian Academy of Sciences contains details as to the plans of the Belgian expedition for the exploration of Central Africa, which is to leave Europe in the course of this month. Dr. Maes, of Hasselt, will accompany the expedition as surgeon and naturalist. The first Belgian station in Central Africa will be placed under the arrangement of Capt. Crespel, with whom Lieut. Cambier and Dr. Maes will be joined. The travellers will start for Zanzibar, and thence reach Lake Tanganyika, where it will be definitely settled whether a station be founded on the shores of the lake, or, a simple dépôt being left there, the station be fixed at Nyangwe, or elsewhere in Manyema. The Tanganyika, or Manyema, or Unyamwesi will become a basis for further scientific exploration; and agriculture will be carried on on the spot for the purpose of enabling the expedition to exist on its own resources.

WE would draw the attention of those of our readers who are interested in the matter to the announcement in our advertising columns with reference to the next distribution of the Government grant of 4,000*l.* Applications should be forwarded to the secretaries of the Royal Society before December 31.

VOL. VII. of the Royal Society’s Catalogue of Scientific papers will be out in a few days.

THE *Gardener’s Chronicle* hears that Signor Beccari is likely to succeed Prof. Parlatore as Director of the Herbarium and Botanic Garden at Florence, if arrangements can be made for some other Professor to undertake the duties of lecturing.

THE death is announced, on September 30, at the age of sixty-five, of Major-General Eardley-Wilmot, F.R.S., formerly chairman of the Council of the Society of Arts. At one time he was Director of Gun Factories at Woolwich, served on many Government committees on military matters, and was frequently consulted on scientific and educational subjects connected with the army.

THE Lords of the Admiralty have ordered that sets of the photographs taken during the Arctic Expedition of 1875–76 shall be presented to the British Museum, the South Kensington Museum, the United Service Institution, the Royal Artillery Institution at Woolwich, the Royal Engineer Institution at Chatham, and other Government or official institutions. Fifty sets only are to be prepared, and they will all be identical with the collection now on view at the Photographic Society’s Exhibition, Pall Mall.

ABOUT eighty of the leading geologists of Germany assembled together in the annual meeting of the Deutsche geologische Gesellschaft, at Vienna, on September 27. Baron von Hauer, of Vienna, Herr Beyrich, of Berlin, and Prof. Gümbel, of Munich, presided over the three sessions which took place. Among the addresses were—“The Geological Constitution of the Harz,” by Dr. Lossen, of Berlin; “The Fauna in the Older Deposits of the Harz and the Geological Position of the Hercynian Formation,” by Dr. Kayser, of Berlin; “Phylogenetic Investigations in Phyto-paleontology,” by Baron v. Ettinghausen of Graz, &c. Prof. Neumayr, of Vienna, gave an interesting report of his late trip through Greece, and exhibited the geological chart of North Greece, Thessaly, and Chalcis, based on his recent investigations.

THE administration of the Paris National Library inaugurated last Saturday a valuable addition to its internal machinery. A small pneumatic tube has been constructed to all parts of the building for conveying notes from readers asking for books. The new buildings erected on the site of the old lecture-room will be ready in a fortnight, and opened for public inspection. The space available for library purposes will be more than doubled by this addition.

THE earthquake of Monday week, to which we referred in our last number, extended from the Lago di Garda to Dijon, and from Strasburg to Grénoble.

THE French Society of Hygiene has just held its first monthly meeting at the Hôtel de la Société d’Encouragement, under the presidency of M. Chevalier, the eminent hygienist. M. Pietra Santa, the secretary, announced that the number of registered members of the new institution, modelled on the English pattern, amounted to more than 300. A letter from the Sanitary Institute announced that the Société d’Hygiène had taken a diploma of honour at the Leamington Exhibition.

THE Manchester Scientific Students’ Association commenced its winter session yesterday, when a paper was read by Mr. Thomas Harrison, F.C.S., on “The Unity of the Senses,” with experiments. Other papers to be read are by Mr. J. Plant, F.G.S., on “Silica;” Mr. William Gee, on “Telephones;” Mr. M. Stirrup, F.G.S., Notes on Auvergne—Puy-de-Dôme—Extinct Volcanoes; Mr. E. P. Quin, on “Vertebrate and Invertebrate Animals;” Mr. Robt. E. Holding, on a visit to the Zoological Society’s Gardens, London; giving a description of some remarkable Animals and Birds—illustrated by diagrams from life; Mr. Geo. C. Yates, F.S.A., on “A Ramble amongst the Dolmens of the Morbihan.”

THE annual *Conversazione* of the Whitehaven Scientific Association took place at the Town Hall of that town on October 9, when the president, Mr. R. Russell, C.E., F.G.S., delivered